

COMPLETE LISTING OF THE CLAIMS

1. (Previously presented) A process for converting gaseous alkanes to liquid hydrocarbons comprising:
 - reacting a gaseous feed having lower molecular weight alkanes with bromine vapor to form alkyl bromides and hydrobromic acid; and
 - reacting said alkyl bromides in the presence of said hydrobromic acid and a catalyst consisting essentially of a synthetic crystalline alumino-silicate catalyst and at a temperature sufficient to form higher molecular weight hydrocarbons and additional hydrobromic acid.
2. (Previously presented) The process of claim 1 wherein said bromine vapor is substantially dry, thereby avoiding the formation of significant carbon dioxide along with said alkyl bromides.
3. (Original) The process of claim 1 wherein said gaseous feed is natural gas.
4. (Previously presented) The process of claim 3 wherein said natural gas is treated to remove substantially all of the carbon dioxide and sulfur compounds therefrom prior to reacting with said bromine vapor.
5. (Original) The process of claim 1 wherein said temperature is from about 150° C. to about 400° C.
6. (Original) The process of claim 5 wherein said temperature is from about 250° C. to about 350° C.
7. (Original) The process of claim 1 wherein said crystalline alumino-silicate catalyst is a zeolite catalyst.
8. (Original) The process of claim 7 wherein said zeolite catalyst is a ZSM-5 zeolite catalyst and said higher molecular weight hydrocarbons contain a C7+ fraction that is composed primarily of substituted aromatics.
9. (Original) The process of claim 8 wherein said ZSM-5 zeolite catalyst is modified with at least one modifying cation selected from hydrogen and Group IA alkaline metals, or Group IIA alkaline earth metals.
10. (Original) The process of claim 9 wherein said ZSM-5 zeolite catalyst is modified by ion exchange with at least one cation selected from hydrogen, sodium, potassium,

cesium, magnesium, calcium or barium.

11. (Previously presented) The process of claim 18 wherein said water is an aqueous solution and said step of contacting comprises:

removing said hydrobromic acid and said additional hydrobromic acid from said higher molecular weight hydrocarbons by neutralization reaction with said aqueous solution containing reaction products obtained by oxidizing an aqueous solution containing a metal bromide salt, the metal of said metal bromide salt being selected from Cu, Zn, Fe, Co, Ni, Mn, Ca or Mg bromide.

12. (Previously presented) The process of claim 1 wherein said bromine vapor is produced by oxidizing an aqueous metal bromide salt solution, the metal of said metal bromide salt being selected from Cu, Zn, Fe, Co, Ni, Mn, Ca, or Mg.

13. (Previously presented) The process of claim 18 wherein said step of contacting comprises:

removing said hydrobromic acid and said additional hydrobromic acid from said higher molecular weight hydrocarbons by dissolution into said water forming a hydrobromic acid solution, said hydrobromic acid solution being neutralized by reaction with an aqueous solution containing a metal hydroxide obtained by oxidizing an aqueous metal bromide salt solution with oxygen, the metal of said metal bromide salt being selected from Cu, Zn, Fe, Co, Ni, Mn, Ca or Mg.

14. (Previously presented) The process of claim 18 wherein said step of contacting comprises removing said hydrobromic acid and said additional hydrobromic acid from said higher molecular weight hydrocarbons by dissolution into said water forming a hydrobromic acid solution, said process further comprising:

vaporizing said hydrobromic acid solution and reacting said vaporized hydrobromic acid solution with a metal oxide, said metal oxide being obtained by oxidizing a metal bromide salt contained on a porous support, the metal of said metal bromide salt being selected from the group Cu, Zn, Fe, Co, Ni, Mn, Ca or Mg.

15. (Previously presented) The process of claim 1 wherein said bromine vapor is produced by oxidizing a metal bromide salt contained on a porous support, the metal of said metal bromide salt being selected from the group Cu, Zn, Fe, Co, Ni, Mn, Ca, or Mg.

16. (Original) The process of Claim 1 wherein said higher molecular weight hydrocarbons contains a C₃, C₄ and C₅₊ fractions in admixture with excess lower alkanes, the process further comprising:

dehydrating said higher molecular weight hydrocarbons to a dew point of about -20° C. or less so as to recover said C₅₊ fractions as a liquid.

17. (Previously presented) The process of claim 16 further comprising:

mixing at least a portion of said C₃ and C₄ fractions with said alkyl bromides and said hydrobromic acid prior to the step of reacting over said synthetic crystalline alumino-silicate catalyst.

18. (Previously presented) A process for converting gaseous lower molecular weight alkanes to liquid hydrocarbons comprising:

reacting a gaseous feed containing lower molecular weight alkanes with bromine vapor to form alkyl bromides and hydrobromic acid;

reacting said alkyl bromides in the presence of a synthetic crystalline alumino-silicate catalyst and hydrobromic acid to form higher molecular weight hydrocarbons and additional hydrobromic acid; and

contacting said hydrobromic acid, said additional hydrobromic acid, and said higher molecular weight hydrocarbons with water to remove said hydrobromic acid and additional hydrobromic acid from said higher molecular weight hydrocarbons.

19. (Previously presented) The process of claim 32 further comprising:

dehydrating said higher molecular weight hydrocarbons.

20. (Previously presented) The process of claim 32 further comprising:

recycling said bromine that is converted from said hydrobromic acid and additional hydrobromic acid to said step of reacting with said gaseous feed, said bromine being recycled as a vapor.

21. (Previously presented) The process according to claim 1 wherein said step of reacting said gaseous feed with said bromine vapor occurs in a first reactor and said step of reacting said alkyl bromides occurs in a second reactor.

22. (Canceled)

23. (Canceled)

24. (Previously presented) The process of claim 1 wherein each of said hydrobromic

acid and said additional hydrobromic acid is a vapor.

25. (Previously presented) The process according to claim 18 wherein said step of reacting said gaseous feed with said bromine vapor occurs in a first reactor and said step of reacting said alkyl bromides occurs in a second reactor.

26. (Canceled)

27. (Canceled)

28. (Previously presented) The process of claim 18 wherein each of said hydrobromic acid and said additional hydrobromic acid is a vapor.

29. (Previously presented) A process for converting gaseous alkanes to liquid hydrocarbons comprising:

introducing a mixture comprising lower molecular weight gaseous alkanes and bromine vapor to a first reactor;

withdrawing alkyl bromides and hydrobromic acid from said first reactor;
introducing said alkyl bromides and said hydrobromic acid into a second reactor containing a synthetic crystalline alumino-silicate catalyst; and

withdrawing an effluent comprising higher molecular weight hydrocarbons and said hydrobromic acid from said second reactor.

30. (Previously presented) The process of claim 29 wherein said higher molecular weight hydrocarbons contains C₅₊ fractions.

31. (Previously presented) The process of claim 29 wherein said hydrobromic acid is a vapor.

32. (Previously presented) The process of claim 18 further comprising:

converting said hydrobromic acid and said additional hydrobromic acid to bromine.